Applent Instruments

Address: Lanlin Dangnan Industrial Park,
Changzhou, Jiangsu, China (PRC)
Post Code: 213014
Telephone (Sales):
0086-0519-88805550 / 89966117/89966227
Fax: 0086-0519-89966550
Sales Email: sales@applent.com
Tech Email: tech@applent.com
http://www.applent.com
http://www.applent.en.alibaba.com



Rev.B0

FIRMWARE REVISIONS
This manual applies directly to instruments that have the firmware **RevE1.0**

# [AT528/AT528L Handheld AC Ohmmeter]
User's Guide

# Safety Summary

 Warning  Dangerous:

| | |
|---|---|
| Disclaimer | Applent Instruments assumes no liability for the customer's failure to comply with these requirements. |
| Ground Instrument | To prevent electric shock, please ground the instrument. |
| DO NOT Operate In An Explosive Atmosphere | Do not operate the instrument in the presence of inflammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard |
| DO NOT Open Instrument Case | Other than replacing the old battery, non-professional maintenance staff do not open the instrument case, in an attempt to repair the instruments |
| DO NOT Substitute Parts Or Modify Instrument | Try to substitute parts or modify instrument will cause protection failure. |
|  | Warning: Do not connect probes with DC voltage or live circuits<br>Warning: Before Test capacitor, make sure that the capacitor has been discharged. |

Safety Sign:

Equipment protection by double insulation or reinforced insulation

Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

Do not discard in household garbage

# CERTIFICATION, LIMITED WARRANTY, & LIMITATION OF LIABILITY

**Applent Instruments, Inc.** (shortened form **Applent**) certifies that this product met its published specifications at the time of shipment from the factory. Applent further certifies that its calibration measurements are traceable to the People's Republic of China National Institute of Standards and Technology, to the extent allowed by the Institution's calibration facility or by the calibration facilities of other International Standards Organization members.

This Applent instrument product is warranted against defects in material and workmanship for a period corresponding to the individual warranty periods of its component products. **The warranty period is 1 year and begins on the date of shipment.** During the warranty period, Applent will, at its option, either repair or replace products that prove to be defective. This warranty extends only to the original buyer or end-user customer of a Applent authorized reseller, and does not apply to fuses, disposable batteries or to any product which, in Applent's opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation or handling.

For warranty service or repair, this product must be returned to a service facility designated by Applent. The buyer shall prepay shipping charges to Applent and Applent shall pay shipping charges to return the product to the Buyer. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Applent from another country.

Applent warrants that its software and firmware designated by Applent for use with an instrument will execute its programming instruction when properly installed on that instrument. Applent does not warrant that the operation of the instrument, or software, or firmware, will be uninterrupted or error free.

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Applent Instruments, Inc.
Changzhou,
Jiangsu,
China,
Oct 2009 Rev.A

# Contents

# 1. Unpacking and Preparation

This chapter describes:

- Incoming Inspection
- Power Supply
- Working Environment
- Cleaning
- Replace Battery
- Adjust Support

## 1.1 Incoming Inspection

1. Referring to <Packing List> in the packing box, check that all packaged items supplied with the meter have been provided as listed
2. Check the appearance of whether there is damage or scratches ;

If there was damage or lack of accessories, please contact Applent Instruments Sales Department or local agency

## 1.2 Power Supply

AC power adapter: ATL909
Rechargeable Li battery: ATL805
Input： 90V-260VAC, 49Hz~62Hz, <10VA

Warning: Do Not use any other power adapter or battery

## 1.3 Working Environment

Environmental Requirements:
Temperature: 0℃～55℃,
Humidity: At 23℃ less than70%RH
Altitude: 0 ~ 2000m

## 1.4 Cleaning

Do not clean the inside of the instrument

Warning: Do not use the cleaning solvent (alcohol or gasoline, etc.) on the instrument.

Please use a clean cloth dipped in some water to do the case and panel cleaning.

## 1.5 Replace Battery

The instrument built-in rechargeable lithium battery, the battery has been installed in the battery compartment of the instrument at the factory. You should replace the battery according to the following procedure.

Figure 1-1 Replace Battery

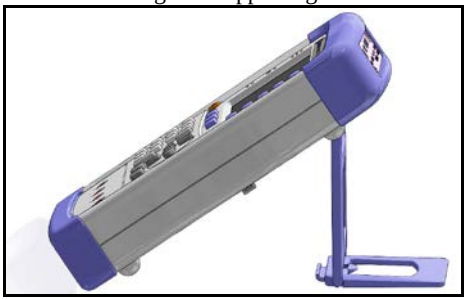
1. Use a screwdriver to loosen the screws of the battery cover, remove the battery cover.
2. Remove the plug on the old battery, plug in new battery plug
3. Put a new battery into the battery compartment, replace the battery cover and tighten the screws.

## 1.6 Adjust Support

The support has two positions:
60 degrees and 45 degrees.
45 degrees, makes the instrument more stable.

Figure 1-2 60 Degrees Supporting

Figure 1-3 45 Degrees Supporting



# 2. Overview

This chapter describes:

- Introduction
- Main Specifications and Features
- Main Functions

## 2.1 Introduction

Thank you for choosing AT528/AT528L Handheld AC Ohmmeter.

AT528/AT528L handheld AC Ohmmeter adopts high-performance 32-bit ARM processor. It is a meter with wide resistance measurement range from 0.01mΩ to 2kΩ (AT528) and DC voltage range from 1.000V to 50.00V.

The instrument features an m-Ohm and V mode that allows simultaneous measurement and comparison of battery internal resistance and open-circuit voltage. This Meter is highly suitable for battery inspection lines as one unit can act as both a low-resistance meter and a voltmeter.

The AT528/AT528L completes with comparator function and external interface utilizing the principles of the AC 4-terminal method that gives priority to line use and offers high speed, high accuracy and high resolution.

AT528 is also equipped with Mini-USB to RS232 interface to apply to remote control, data acquisition and analysis.

## 2.2 Functional Comparison AT528 and AT528L

| Model | Resistance Range | Voltage Range | Accuracy |
|---|---|---|---|
| AT528 | 0.01mΩ-2kΩ | 0.0001~50.00V | 0.1% |
| AT528L | 0.1mΩ-200Ω | 0.001~50.00V | 0.5% |

## 2.3 Main Specifications and Features

- Basic Accuracy: Resistance: 0.5% Voltage: 0.1% (AT528)
- Max Display: Resistance:2200 digit, Voltage: 50000 digit(AT528)
- 6 rangers with Auto, Manual and Nominal Modes
- Four-terminal test method
- Test Speed: 20 times/s (FAST mode, AT528, Range Hold Mode)
- Trigger Mode: Internal, Manual and BUS trigger

## 2.4 Main Functions

### 2.4.1 Correction

Short-circuit Clear Zero correction for all ranges.

### 2.4.2 Comparator (Sorting Function)

Set up sorting function to do GD/NG sorting.

- **Comparator Methods:**
  Absolute value of tolerance ±TOL sorting
  Percentage tolerance %TOL sorting
  Sequence comparison sorting
- **Beep Feature:**
  Beep: OFF/GD/NG

### 2.4.3 System Setup

1. Keypad Lock Function
2. Switch Both in Chinese and English
3. Time and Date Settings
4. Administrator Accountant Settings
5. Background Brightness Settings
6. Auto Power Off settings

### 2.4.4 Remote Control

Max baud rate: 115200bps, SCPI available, ASCII transmit.

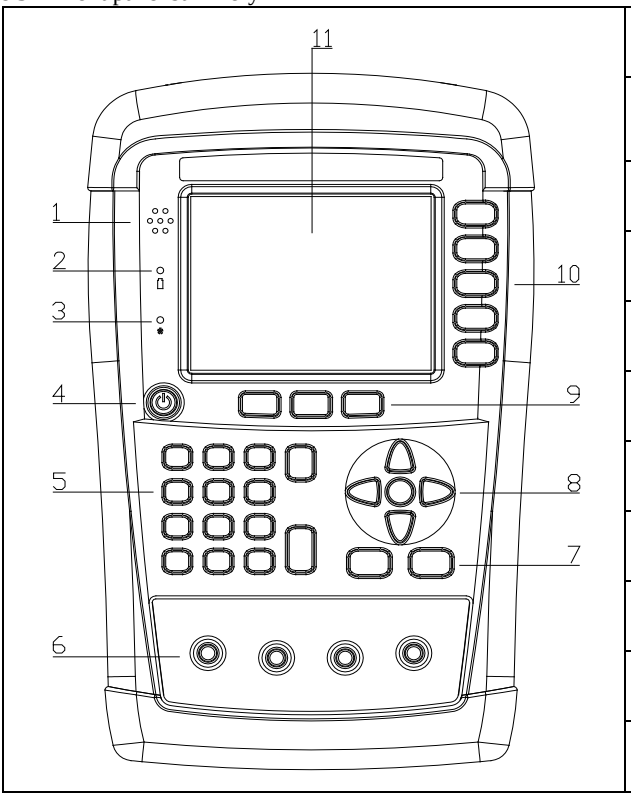
# 3. Startup

This chapter describes:

- Front Panel Summery
- Interfaces
- Power Supply
- Turn on/off
- Test Slots

## 3.1 Front Panel Summery

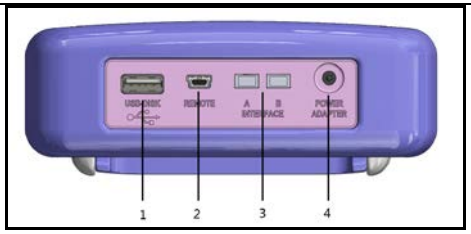
Table 3-1 Front panel summery




| | |
|---|---|
| 1 | Beep |
| 2 | Battery Charging Indicator |
| 3 | Trigger Indicator |
| 4 | Power on/off |
| 5 | Numeric Keys |
| 6 | Test Slots |
| 7 | Main Page Key |
| 8 | Direction Keys |
| 9 | Soft keys 1 |
| 10 | Soft keys 2 |
| 11 | TFT-LCD Screen |

## 3.2 Interfaces

Figure 3-1 Interfaces




1. USB Host Port
2. Mini-USB Slave Port
3. Reserved Interfaces
4. Power Adaptor

## 3.3 Power Supply

Power adaptor: ATL909
The instrument can be powered by Li battery. When the battery is low, only power adaptor can charge the battery.

Figure 3-2 Instrument and power adaptor

### 3.3.1 Charge the Battery

Use the power adaptor to charge the battery. The power key is orange when charging the battery even the instrument turned off. When the battery is full, the indicator is out.

Figure 3-3 Power key is orange when charging.

| | |
|---|---|
| Attention ! | The power key is still orange while charging even when the instrument shut down. |

## 3.4 Turn On/Off

Press power key softly to start or turn off the instrument.

## 3.5 Test Slots

Insert the cable box into test slots

Figure 3-4 Test Slots

### 3.5.1 Clips and Cables:

Using clip or cable from other brands may cause mistakes
After a long time（1~2 Years）, the surface of the accessories may be damaged, which will lead some inaccuracy.

# 4. [MEAS] Key

This chapter describes:

- <MEAS DISPLAY> Page
- Short-Circuit Correction
- <COMPARATOR>Page

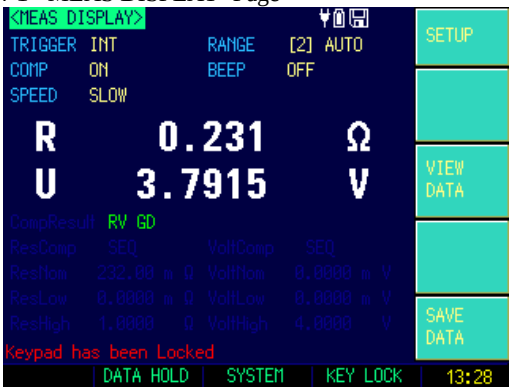
## 4.1 <MEAS DISPLAY>Page

Press [Meas] key to enter <MEAS DISPLAY>Page.

The <MEAS DISPLAY> page includes following setup:

- Trigger Mode [TRIGGER]
- Measurement Range [RANGE]
- Test Speed [SPEED]
- Comparator [COMP] ON/OFF
- [BEEP] Feature
- Softkey VIEW DATA – To Enter [VIEWDATA] page
- Softkey SAVE DATA – To Store Current Measurement Result into Internal Flash Disk

Figure 4-1 <MEAS DISPLAY>Page




### 4.1.1 [TRIGGER]

AT528/528L includes three following settings:
Internal trigger, Manual trigger and BUS trigger.

Table 4-1 Trigger Setting

| Trigger | |
|---|---|
| Internal | Internal Trigger |
| Manual | Press [Enter] key once, the instrument runs a test cycle |
| BUS | Received a RS232 trigger command, the instrument runs a test cycle |

■Procedure to set the trigger:

| | | |
|---|---|---|
| Step 1 | Press [Meas] key to enter <MEAS DISPLAY>Page | |
| Step 2 | Use cursor keys to select [TRIGGER] field | |
| Step 3 | INT | Automatic Internal trigger |
| | MAN | Manual trigger by pressing [Trig] key |
| | BUS | BUS trigger by RS232 SCPI command |

### 4.1.2 Resistance [RANGE]

AT528/528L has three range modes:
Auto range, Manual range and Nominal range

Table 4-2 Resistance Ranges

| Range | Description | Pros | Cons |
|---|---|---|---|
| AUTO | Automatically select the best range according to impedance Range is automatically set. | Very convenient | Test speed is slower than manual ranging, |
| HOLD | The instrument will always use the user-specified range | Highest speed | Set the range previously |
| NOMINAL | Automatically select the best range according to nominal value. | Best mode for sorting. | Only available in sorting mode |

Table 4-3 Resistance Measurement Range of AT528

| Range | Range Name | Measurement Range |
|---|---|---|
| 5 | 2kΩ | 200Ω ~2.2kΩ |
| 4 | 200Ω | 20Ω~220Ω |
| 3 | 20Ω | 2Ω~22Ω |
| 2 | 2Ω | 200mΩ ~2.2Ω |
| 1 | 200mΩ | 20mΩ ~220mΩ |
| 0 | 20mΩ | 0mΩ ~22mΩ |

Table 4-4 Resistance Measurement Range of AT528L

| Range | Range Name | Measurement Range |
|---|---|---|
| 4 | 200Ω | 20Ω~220Ω |
| 3 | 20Ω | 2Ω~22Ω |
| 2 | 2Ω | 200mΩ ~2.2Ω |
| 1 | 200mΩ | 20mΩ ~220mΩ |
| 0 | 20mΩ | 0mΩ ~22mΩ |

■Procedure of setting the range:

| | |
|---|---|
| Step 1 | Press [Meas] key to enter measurement page |
| Step 2 | Use the cursor key to select [Range] |

| | | |
|---|---|---|
| Step 3 | AUTO | Auto range |
| | HOLD | Current range is hold |
| | NOMINAL | Select the range according to resistance nominal value [ResNom]. |
| | INCR+ | Increase range |
| | DECL- | Decline range |

The DC voltage measurement range cannot be selected. Instrument always uses automatic range mode.

### 4.1.3 Test [SPEED] (AT528 only)

SLOW, MED and FAST can be selected for AT528
SLOW mode will result in more stable and accurate measurement result.
(Only Slow speed mode for AT528L).
The following speed is measured in range-hold mode:

SLOW: 2 times/sec
MED: 10 times/sec
FAST: 20 times/sec

The following speed is measured in range-auto mode:

SLOW: 1.8 times/sec
MED: 6.8 times/sec
FAST: 16 times/sec

■Procedure to set test speed:

| | | |
|---|---|---|
| Step 1 | Press [Meas] key to enter measurement page; | |
| Step 2 | Use the cursor key to select [SPEED] field | |
| Step 3 | SLOW | |
| | MED | |
| | FAST | |

### 4.1.4 Comparator [COMP]

Set the comparator parameter in <**SETUP**> page, this page is about how to turn on/off comparator.

■Procedure to turn COMP on/off:

| | | |
|---|---|---|
| Step 1 | Press [Setup] key to enter setup page; | |
| Step 2 | Use the cursor key to select [COMP]; | |
| Step 3 | OFF | Comparator off |
| | ON | Comparator on |

### 4.1.5 [BEEP] Feature

■Procedure to set the beep:

| | | |
|---|---|---|
| Step 1 | Press [Meas] key to enter measurement page; | |
| Step 2 | Use the cursor key to select [BEEP] | |
| Step 3 | OFF | Turn Beep Off |
| | GD | Beep while Pass |
| | NG | Beep while Fail |

### 4.1.6 Status Bar on <MEAS DISPLAY>

- HOLD – Hold the data, test stops.
- SYSTEM– Go to <SYSTEM CONFIG>Page
- KEY LOCK – Lock the keypad.
- Time

### 4.1.7 Icons on <MEAS DISPLAY>

Table 4-5 Icons

| Icon | Description |
|---|---|
|  | Powered by Li battery |
|  | Powered by external power supply |
|  | USB-Disk is available. |
| H | Hold current data. |

### 4.1.8 [VIEW DATA] Softkey

To enter the <VIEW DATA> page by pressing [VIEW DATA] softkey.

### 4.1.9 [SAVE DATA] Softkey

Every press this key a line of measurement result will be stored into internal flash disk. The saved data can be reviewed on <VIEW DATA> page by pressing [VIEW DATA] softkey.

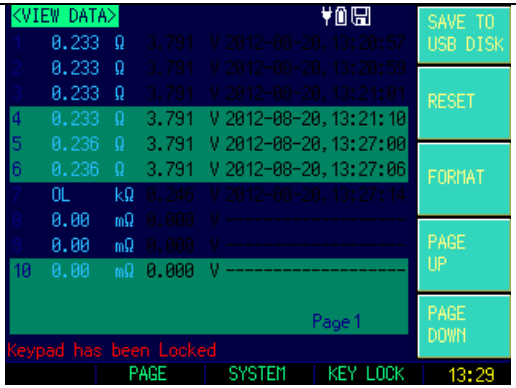
## 4.2 <VIEW DATA> page

The measurement result can be stored in AT528/AT528L's internal nonvolatile memory by press the [SAVE DATA] softkey in <MEAS DISPLAY> page.

The format of measurement result is:
[Resistance][Voltage][Date][Time]

You can review the saved data on the <VIEW DATA> page by pressing the [VIEW DATA] softkey in <MEAS DISPLAY> page.

Figure 4-2 <VIEWDATA> page




- SAVE TO DISK – Store all data into USB Disk
- RESET – The data will be stored from the start of the table.
- FORMAT – To format the internal nonvolatile memory disk, all data will be lost.
- PAGE – Jump to the provided page

# 5. [SETUP] Key

This chapter describes:

- <STEUP> page

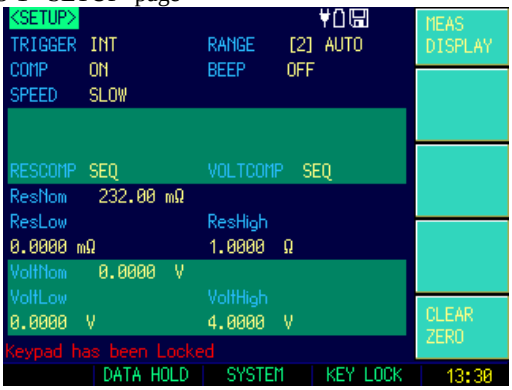
## 5.1 < SETUP> page

Press [Setup] key to enter <SETUP>page.
In <SETUP> page, the Instrument does not display measurement result and comparator result, testing is not in progress.
The <SETUP> page includes following setup:

- Trigger Mode [TRIGGER]
- Measurement Range [RANGE]
- Test Speed [SPEED]
- Comparator [COMP] ON/OFF
- BEEP Feature
- Softkey CLEAR ZERO – Clear Zero Correction
- RESMODE – AC Resistance Sorting Methods
- VOLTCOMP– DC Voltage Sorting Methods
- ResNom – Input Resistance Nominal Value
- ResLow – Input Resistance Low Limit
- ResHigh – Input Resistance High Limit
- VoltNom – Input Voltage Nominal Value
- VoltLow – Input Voltage Low Limit
- VoltHigh – Input Voltage High Limit

Some settings can be also set up in <MEAS DISPLAY> page.

Figure 5-1 <SETUP>page



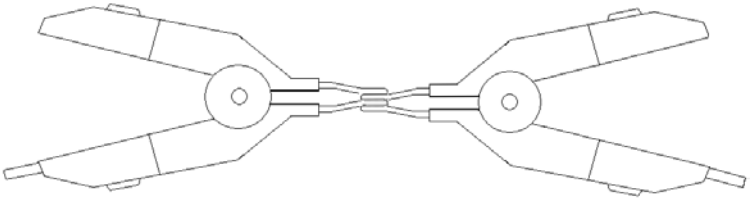
## 5.2 Short-circuit Clear Zero [CLEAR ZERO]

Press [Setup] key to enter < SETUP> page, and then press [CLEAR ZERO] softkey to do short-circle clear zero.
After correction, the value will be saved into internal flash disk.

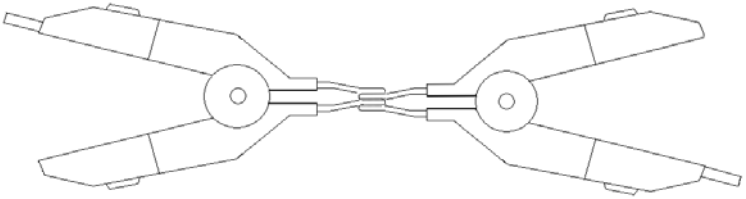
It is necessary to do short-circle clear zero.
When replace the test fixture or test cables, please do short –circle clear zero.

How to connect the test clips before executing short-circle clear.

Figure 5-2 Connect the test clip



WRONG! DO NOT connect it like this!



### 5.2.1 Comparator Mode [RESMODE][VOLTMODE]

There are several items for choosing:
ABS – Absolute Mode [ABS = Result – Nominal]
SEQ – Sequential Mode
PER – Percentage Mode [PER = (Result – Nominal) / Nominal * 100%]

■Procedure to set comparator mode:

| | | |
|---|---|---|
| Step 1 | Press [Meas] key to enter <MEAS DISPLAY> page | |
| Step 2 | Select [COMP SETUP] softkey to enter <COMP SETUP> page. | |
| Step 3 | Use cursor key to select [RESMODE] | |
| Step 4 | ABSΔ | Result– nominal |
| | PERΔ% | (Result – nominal) / nominal × 100% |
| | SEQ | Compare result with low and high limited values. |

### 5.2.2 Comparator Nominal [ResNom][VoltNom]

When using the ABS and PER mode, the nominal value must be inputted.
The field is ignored when in SEQ mode.
The Nominal value must be positive.

■Procedure to input nominal value:

| | |
|---|---|
| Step 1 | Press [Meas] key to enter <MEAS DISPLAY> page |
| Step 2 | Select [COMP SETUP] softkey to enter <COMP SETUP> page. |
| Step 3 | Use cursor key to select [ResNom] or [VoltNom] |
| Step 4 | Input the nominal value by numeric keypad. |

### 5.2.3 Low Limit and High Limit [ResLow] [ResHigh][VoltLow][VoltHigh]

The high limited value should be greater than low nominal value.

- When in ABSΔ Mode, please input the absolute value of resistance or voltage.
- When in PERΔ% Mode, please input the relative value of resistance or voltage in %.
- When in SEQ Mode, please input the direct value of resistance or voltage.

■Procedure to input high/low limited values:

| | |
|---|---|
| Step 1 | Press [Meas] key to enter <MEAS DISPLAY> page |
| Step 2 | Use softkey to select [COMP SETUP] and enter <COMP SETUP> page. |
| Step 3 | Use cursor keys to select [ResLow][ResHigh][VoltLow] or [VoltHigh] field |
| Step 4 | Please input the percentage value in when [PER Δ%] mode<br>Please input the Direct value when in ABSΔ and SEQ mode. |

# 6. <SYSTEM CONFIG> page

This chapter describes:

- SYSTEM CONFIG
- SYSTEM INFORMATION
- SYSTEM SERVICE

## 6.1 <SYSTEM CONFIG>page

Press [SYSTEM] bottom softkey to enter <**SYSTEM CONFIG**> page.

- LANGUAGE – Choose English or Chinese Language
- DATE/TIME
- ACCOUNT
- BEEP Feature
- DIM DISPLAY
- APO
- BAUD Rate

All settings in <**SYSTEM CONFIG**> will be saved into internal flash disk automatically.

Figure 6-1 <SYSTEM CONFIG> page


### 6.1.1 [LANGUAGE]

■Procedure to change language:

| | | |
|---|---|---|
| Step 1 | Press [Meas] or [Setup] key to enter main page | |
| Step 2 | Press bottom softkey [SYSTEM] to enter <SYSTEM CONFIG> | |
| Step 3 | Use cursor keys to select [Language] field | |
| Step 4 | CHINESE | |
| | ENGLISH | |

### 6.1.2 [ACCOUNT], [PASSWORD]

- ADMIN – Except［SYSTEM SERVICE］, all settings are available and can be saved.

- USER – Except［SYSTEM SERVICE］, all settings are available but can **not** be saved.

■Procedure to set up account:

| | | |
|---|---|---|
| Step 1 | Press [Meas] or [Setup] key to enter main page | |
| Step 2 | Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> | |
| Step 3 | Use cursor key to select [ACCOUNT] field | |
| Step 4 | ADMIN | Except <SYSTEM SERVICE>, all settings are available and can be saved |
| | USER | Except<SYSTEM SERVICE>, all settings are available but can not be saved. |

■Procedure to set password:

| | | |
|---|---|---|
| Step 1 | Press [Meas] or [Setup] key to enter main page | |
| Step 2 | Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> | |
| Step 3 | Use cursor key to select [PASSWORD] field | |
| | CHANGE PASSWORD | No more than 9 digits and only digits and letters can be input.<br>Contact us if you forget your password. |
| | DELETE PASSWORD | |

### 6.1.3 [DATE], [TIME]

The instrument uses a 24-hour time.

■Procedure to set data:

| | | |
|---|---|---|
| Step 1 | Press [Meas] or [Setup] key to enter main page | |
| Step 2 | Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> | |
| Step 3 | Use cursor keys to select [DATE] field | |
| Step 4 | YEAR INCR+ | |
| | YEAR DECR- | |
| | MONTH INCR+ | |
| | DAY+ | |
| | DAY- | |

■Procedure to set time:

| | | |
|---|---|---|
| Step 1 | Press [Meas] or [Setup] key to enter main page | |
| Step 2 | Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> | |
| Step 3 | Use cursor keys to select [TIME] field | |
| Step 4 | HOUR INCR+ | |
| | HOUR DECR- | |
| | MINUTE DECR+ | |
| | MINUTE DECR- | |
| | SECOND INCR+ | |
| | SECOND DECR- | |

### 6.1.4 DIM DISPLAY

Dim the background light can save battery power.

■Procedure to set background brightness:

| | | |
|---|---|---|
| Step 1 | Press [Meas] or [Setup] key to enter main page | |
| Step 2 | Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> | |
| Step 3 | Use cursor keys to select [DIM DISPLAY] field | |
| Step 4 | Bright 10% | Low power |
| | Bright 25% | Default Set |
| | Bright 50% | |
| | Bright 75% | |
| | Bright 100% | High power |

### 6.1.5 Auto Power Off [APO]

■Procedure to set up auto power off:

| | | |
|---|---|---|
| Step 1 | Press [Meas] or [Setup] key to enter main page | |
| Step 2 | Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> | |
| Step 3 | Use cursor keys to select [APO] Field | |
| | 5MIN | Default Set |
| | 15MIN | |
| | 30MIN | |
| | 60MIN | |
| | OFF | The Instruments will work until the battery power is exhausted |

### 6.1.6 RS232 [BAUD] rate

Connect instrument to computer via Mini-USB to RS232 port, the instrument will communicate with PC, meanwhile the keypad will be locked.
Use SCPI language in Mini-USB programming.

Mini-USB to RS232 format:

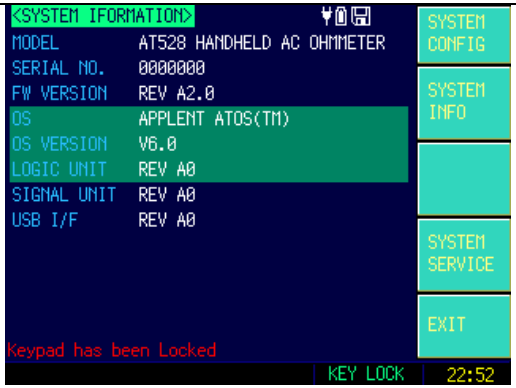
- Data bits: 8
- Stop bits: 1
- Parity: none

■Procedure to set baud rate:

| | | |
|---|---|---|
| Step 1 | Press [SYSTEM] bottom softkey to enter <SYSTEM CONFIG> page | |
| Step 2 | Use cursor to select [BAUD] field | |
| Step 3 | 1200 | For communication converter with opt coupler isolation |
| | 9600 | |
| | 38400 | |
| | 57600 | |
| | 115200 | Best for communication with PC |

## 6.2 <SYSTEM INFORMATION>

Figure 6-2 <SYSTEM INFORMATION>page




■Procedure to view system information:

| | |
|---|---|
| Step 1 | Press [Meas] or [Setup] key to enter main page |
| Step 2 | Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> |
| Step 3 | Press softkey [SYSTEM INFORMATION] to enter <**SYSTEM INFORMATION**> page |

## 6.3 <SYSTEM SERVICE>

**Warning:**
Not available for users
Any unprofessional person is not allowed to have access to this page.

# 7. Specification

This chapter describes:

- Basic Specifications
- Dimensions

## 7.1 General Specifications

Accuracy is defined as meeting all of the following conditions.

- Temperature：23℃±5℃
- Humidity：≤65% R.H.
- Correction：Short-circuit Clear Zero
- Warming Time：>60min
- Adjustment Time：12months

Working Environment:

- Nominal：Temperature 15℃~35℃ Humidity<80%RH
- Working： Temperature 10℃~40℃ Humidity10~90%RH
- Storage： Temperature 0℃~50℃ Humidity10~90%RH

The following speed is measured in range-hold mode:

SLOW: 2 times/sec
MED: 10 times/sec [AT528]
FAST: 20 times/sec [AT528]

The following speed is measured in range-auto mode:

SLOW: 1.8 times/sec
MED: 6.8 times/sec [AT528]
FAST: 16 times/sec [AT528]

### 7.1.1 AT528 AC Resistance Range

| RANGE | | Max Reading | Resolution | FAST | MED | SLOW | Test Current |
|---|---|---|---|---|---|---|---|
| 0 | 20mΩ | 22.00mΩ | 0.01mΩ | 0.8%±5 | 0.6%±3 | 0.5%±2 | 10mA |
| 1 | 200mΩ | 220.0mΩ | 0.1mΩ | 0.8%±4 | 0.6%±3 | 0.5%±2 | 1mA |
| 2 | 2Ω | 2.200Ω | 1mΩ | 0.8%±4 | 0.6%±3 | 0.5%±2 | 0.1mA |
| 3 | 20Ω | 22.00Ω | 10mΩ | 0.8%±4 | 0.6%±3 | 0.5%±2 | 10μA |
| 4 | 200Ω | 220.0Ω | 100mΩ | 0.8%±4 | 0.6%±3 | 0.5%±2 | 5μA |
| 5 | 2 kΩ | 2.200kΩ | 1Ω | 0.8%±4 | 0.6%±3 | 0.5%±2 | 2μA |
| Open-circuit Voltage: <30 mVrms | | | | | | | |

### 7.1.2 AT528 DC Voltage Range

| RANGE | | Max Reading | Resolution | FAST | MED | SLOW |
|---|---|---|---|---|---|---|
| 1 | 5V | 5.0000V | 0.0002V | 0.5%±4 | 0.5%±2 | 0.1%±5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 50V | 50.000V | 0.002V | 0.5%±4 | 0.5%±3 | 0.1%±5 |

### 7.1.3 AT528L AC Resistance Range

| RANGE | | Max Reading | Resolution | FAST | MED | SLOW | Test Current |
|---|---|---|---|---|---|---|---|
| 1 | 200mΩ | 220.0mΩ | 0.1mΩ | 0.8%±4 | 0.6%±3 | 0.5%±2 | 1mA |
| 2 | 2Ω | 2.200Ω | 1mΩ | 0.8%±4 | 0.6%±3 | 0.5%±2 | 0.1mA |
| 3 | 20Ω | 22.00Ω | 10mΩ | 0.8%±4 | 0.6%±3 | 0.5%±2 | 10μA |
| 4 | 200Ω | 220.0Ω | 100mΩ | 0.8%±4 | 0.6%±3 | 0.5%±2 | 5μA |
| Open-circuit Voltage: <30 mVrms | | | | | | | |

### 7.1.4 AT528L DC Voltage Range

| RANGE | | Max Reading | Resolution | FAST | MED | SLOW |
|---|---|---|---|---|---|---|
| 1 | 5V | 5.000V | 1mV | 0.5%±5 | 0.5%±3 | 0.5%±2 |
| 2 | 50V | 50.00V | 10mV | 0.5%±5 | 0.5%±3 | 0.5%±2 |

## 7.2 Features

- 3.5inch 16M color TFT-LCD screen
- Internal, External and Manual trigger.
- Range Auto, Manual and Nominal mode
- ABS, PER and SEQ sorting methods
- Short-circuit clear zero for all ranges
- Temperature compensation
- Data hold function
- Customizable beep feature
- Keypad lock
- Switch both in Chinese and English
- Auto power off
- Four-terminal test method
- Built-in Mini-USB to RS232 interface
- SCPI commands available.
- 8.4V Li, 2200mAh rechargeable battery
- Charging time < 5h
- Working time≥8h @25% Brightness
- Power: <5W
- Dimension: 210.76mm*130.23mm*37.88mm
- Weight: 500g